



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE

United States Patent and Trademark Office

Address: COMMISSIONER FOR PATENTS

P.O. Box 1450

Alexandria, Virginia 22313-1450

www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/713,626	11/13/2003	Peter A. Benson	108298743US	2439
25996	7590	08/07/2008		
PERKINS COIE LLP			EXAMINER	
PATENT-SEA			IM, JUNGHWAN M	
P.O. BOX 1247			ART UNIT	
SEATTLE, WA 98111-1247			PAPER NUMBER	
			2811	
			MAIL DATE	
			DELIVERY MODE	
			08/07/2008	
			PAPER	

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/713,626

Applicant(s)

BENSON ET AL.

Examiner

JUNGHWAN M. IM

Art Unit

2811

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 April 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 5.9-17, 19-24 and 60-65 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 5.9-17, 19-24 and 60-65 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 13 November 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 9-17, 19-24 and 60-65 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kurashima et al. (US 6608371), hereinafter Kurashima in view of Cloud et al. (US 6525413), hereinafter Cloud and Pogge et al. (US 6835589), hereinafter Poggi

Regarding claims 9, 21 and 60, Fig. 4A of Kurashima shows a microfeature workpiece, comprising:

a plurality of first dies [13; Fig. 7 and col. 15, lines 30-34], wherein individual first dies have a first surface and a second surface opposite the first surface wherein individual first dies have a first integrated circuit and a bond pad site electrically coupled to the integrated circuit; and

a plurality of first conductive mating structures [24], the first conductive mating structures projecting away from the dies and having openings to receive and interconnect with corresponding complementary second conductive mating structures [32] on second dies [11; Fig. 7 and col. 15, lines 30-34] which are to be mounted to corresponding first dies.

Fig. 4A of Kurashima shows most aspects of the instant invention except a plurality of bond pads electrically coupled to the first integrated circuit, the mating structures proximate to the pads and the first conductive mating structures having openings projecting away from second surface of the first dies and configured to receive and interconnect with corresponding complementary second conductive mating structures on second dies which are to be mounted to corresponding first dies; and a plurality of conductive links individually extending from the first surface to the second surface of the individual first dies, the individual conductive links having a first end proximate to the first surface and in direct contact with the individual first pads and a second end proximate to the second surface and defining a second pad corresponding to the opening of the individual first conductive mating structures." Fig. 3 of Cloud shows a stacked semiconductor device [10, 20] wherein a plurality of bond pads [14, 16] electrically coupled to the integrated circuit and the mating structures proximate to the pads. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to incorporate the teachings of Cloud into the device of Kurashima in order to have a plurality of bond pads electrically coupled to the first integrated circuit to carry the signals to the mounting board.

The combination of Kurashima/Cloud shows most aspects of the instant invention except a plurality of conductive links individually extending from the first surface to the second surface of the individual dies, the individual conductive links having a first end proximate to the first surface and in direct contact with the individual

first pads and a second end proximate to the second surface and defining a second pad corresponding to the opening of the individual first conductive mating structures

Fig. 8C of Pogge shows the mating structure (75) having openings projection away from a surface of the die to receive the complementary mating structure (85) and a plurality of conductive links (56) individually extending from the first surface to the second surface of the individual dies (51), the individual conductive links having a first end proximate to the first surface and in direct contact with the individual first pads (58) and a second end proximate to the second surface and defining a second pad corresponding to the opening of the individual first conductive mating structures. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to incorporate the teachings of Pogge into the device of Kurashima/Cloud in order to have the mating structure having openings projection away from a surface of the die to receive the complementary mating structure, therefore, having the first conductive mating structures having openings projecting away from a surface of the first dies and configured to receive and interconnect with corresponding complementary second conductive mating structures on second dies which are to be mounted, and in order to have a conductive link individually extending from the first surface to the second surface of the individual dies, the individual conductive links having a first end proximate to the first surface and in direct contact with the individual first pads and a second end proximate to the second surface and defining a second pad corresponding to the opening of the individual first conductive mating structures in direct contact with the mating structures for compact structure.

Regarding claims 10 and 22, Fig. 3 of Cloud shows that the first conductive mating structures have generally circular configurations.

Regarding claim 11, Fig. 4A of Kurashima shows that the first conductive mating structures have generally triangular configurations.

Regarding claim 12, the combined teachings of Kurashima and Cloud fail to teach that "the first conductive mating structures have generally rectangular configurations." However, it would have been obvious matter of accommodating desired specification since such a modification would have involved a mere change in the shape of a component. A change in shape is generally recognized as being within the level of ordinary skill in the art. *In re Dailey*, 357 F.2d 669, 149 USPQ 47 (CCPA 1966).

Regarding claims 13 and 23, Fig. 4A of Kurashima shows that the first conductive mating structures include an aperture configured to receive at least a portion of one of the second conductive mating structures.

Regarding claims 14 and 24, Fig. 4A of Kurashima shows that the first conductive mating structures have male configurations.

Regarding claim 15, Fig. 4A of Kurashima shows that the first conductive mating structures have female configurations.

Regarding claim 16, Fig. 3 of Cloud shows that the first conductive mating structures comprise solder (col. 6, lines 61-63).

Regarding claim 17, Fig. 3 of Cloud shows that the first dies include a first side and a second side opposite the first side; the first pads comprise a plurality of bond-

pads on and/or in the first side of the first dies; and the first conductive mating structures are coupled to the bond-pads on the first side of the first dies (col. 6, lines 38-44).

Regarding claim 19, Fig. 7 of Kurashima shows the first dies include a third die, and it would have been obvious that the combined teachings of Kurashima and Cloud show the third die including a third pad adjacent to the first pad on the first die since the first die and the third die are adjacent to each other.

The combined teachings of Kurashima and Cloud fail to teach that "third pads are spaced apart from each other by a distance of less than approximately 100 microns." However, it would have been obvious to one of ordinary skill in the art at the time of the invention made to have third pads spaced apart from each other by a distance of less than approximately 100 microns for a compact packaging, since it would have been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only in routine skill in the art. *In re Aller*, 105 USPQ 233.

Regarding claim 20, Fig. 3 of Cloud shows that the first conductive mating structures are formed on corresponding first pads.

Regarding claim 61, the combination of Kurashima/Cloud/Tonti would show the surface is a first surface and the first die includes a second surface opposite the first surface, and wherein the conductive link includes a via extending from the first surface to the second surface.

Regarding claim 62, Fig. 15 of Tonti shows the bond site is a first bond site, and wherein the conductive link forms a second bond site proximate to the first conductive mating structure.

Regarding claim 63, Fig. 18 of Tonti shows the second bond site corresponds to the opening of the first conductive mating structure.

Regarding claim 64, Fig. 18 of Tonti shows the second bond site is generally aligned with the opening of the first conductive mating structure.

Regarding claim 65, Fig. 18 of Tonti shows the first conductive mating structure has a generally circular configuration, a generally triangular configuration, or a generally rectangular configuration.

Response to Arguments

Applicant's arguments with respect to pending claims have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within

TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JUNGHWA M. IM whose telephone number is (571)272-1655. The examiner can normally be reached on MON.-FRI. 7:30AM-4:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lynne A. Gurley can be reached on (571) 272-1670. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Lynne A. Gurley/

Application/Control Number: 10/713,626

Page 9

Art Unit: 2811

Supervisory Patent Examiner, Art Unit 2811

/J. M. I./

Examiner, Art Unit 2811

